Childhood Obesity

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This continuing medical education program includes:
- Statement of learning objectives
- Pretest questions and answers
- Audio recording and printed transcript of panel discussion
- Post-test questions
- Post-test response form
- List of recommended supplementary reading materials

Washington University designates this enduring material for a maximum of 3 AMA PRA Category 1 Credit(s)™ towards the AMA Physician’s Recognition Award.
Learning Objectives

This enduring material is designed for pediatricians, nurse practitioners, and other allied health professionals who care for children. The intended result of this activity is to achieve a change in competence, performance, and patient care. After completing this activity, the participant should be better able to:

1. Properly identify and sensitively communicate weight status at a well-child visit.
2. Recognize the stages of obesity management for children and referral options.
3. Order and interpret laboratory studies relevant to the evaluation and management of childhood obesity.
4. Set patient-centered goals and follow-up “BMI checks.”
5. Discuss pharmacological and surgical options for children with obesity.
6. Address barriers to successful behavior change by patients and families.

Pretest Questions

Before listening to the audio CD or examining the transcript of the panel discussion, you will find it useful to test your general understanding of the subject of this program with this brief introductory quiz. (The correct answers can be found on page 9 of this booklet.)

1. The prevalence of obesity in adolescence has been decreasing over the past 30 years.
   - True
   - False

2. Children with severe obesity have a 50% chance of having some component of metabolic syndrome.
   - True
   - False

3. 20% to 40% of adolescents with obesity have an eating disorder.
   - True
   - False

4. POMC deficiency is the most common single-gene mutation that results in early-onset obesity.
   - True
   - False

5. For a 3-year-old who is classified as overweight, the AAP recommends screening with a fasting lipid panel.
   - True
   - False

6. Adolescents who undergo bariatric surgery typically have better outcomes and fewer complications than do adults who undergo bariatric surgery.
   - True
   - False

This course can be completed by listening to the audio CD and by reading the transcript. A multiple-choice test must be completed to earn CME credits. In order to receive credit, a participant must have a designated passing grade of 75%. The estimated time to complete this activity is 3 hours.

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For more information on the CME activity, please visit our website at CME-WUSM.org.
Has no financial interest or other relationship to disclose.

1. See Ogden et al (17) in List of Supplementary Reading Materials.
2. See Fryar et al (9) in List of Supplementary Reading Materials.
3. See Ogden et al (18) in List of Supplementary Reading Materials.
4. See Weiss et al (23) in List of Supplementary Reading Materials.
5. See August et al (5) in List of Supplementary Reading Materials.
6. Ibid.
7. Ibid.
8. Ibid.
9. Ibid.
10. Ibid.

Today, we’ll be discussing “Childhood Obesity.” I’m very excited to be sitting here with my colleagues, Shirley Huang and Jessica Tomasula. Together, we hope to provide you with a better understanding of how to properly identify and sensitively communicate weight status at a well-child visit. We will also discuss the staged approach to managing childhood obesity, as well as which laboratory studies and medications would be relevant to the evaluation and management of obesity and how to set patient-centered goals and BMI (body mass index) follow-up visits. Finally, we hope to provide you with helpful tools to address some of the barriers to successful behavior change that you may encounter from your patients and families.

To get started, I want to get a better understanding of not only the overwhelming magnitude of this problem, this chronic disease, but how it impacts our patients on a day-to-day basis. We’re all heard that nearly 1 in 5 children are classified as obese, which is defined as a BMI over 95th percentile. This prevalence has tripled in the past 30 years and continues to increase, especially among our adolescents and school-aged children. Shirley, can you give us an idea how this disease affects certain populations of children?*

DR. HUANG: This has been an epidemic for the past 5 to 4 decades; and this issue of obesity spans all ethnic groups, all ages, all income levels, and across the globe. There are specific groups that are higher risk for obesity. We know that Hispanics and African Americans do have the highest risks of obesity; in fact, Hispanic males and African American females have the highest rates of obesity. Unfortunately, these rates have remained unchanged since 2003. We also know that the longer you live here, in the United States, the higher the risk of obesity. Second- and third-generation Asian Americans and Hispanic Americans have higher rates of obesity compared to their first-generation counterparts. Living in poverty and having a lower socioeconomic status is associated with higher rates of obesity. On a global level, we often think of this disease as an industrialized country issue, but we’re seeing it more and more in developing countries as well. We’re seeing shifts in these countries so that both ends of the malnutrition spectrum are being seen, that includes both undernutrition as well as overnutrition.

DR. HILL: Something that we might not emphasize enough is how severe the effects of this chronic disease are on the health of our children. This affects every organ system. We are seeing what we call “medical complications of obesity” or comorbidities in young children that we used to only see in adults. Can you share a little bit more about some of these conditions that you are seeing your clinic, Shirley?

DR. HUANG: Sure. When families come in to see me, I usually talk about their weight as just one piece of the puzzle because I think we’re all different shapes and sizes. But when that weight starts to affect your health and your body, that’s definitely when I do get concerned. I like to think about what are the health issues short term for kids at that certain age group, at that time; and then also, as they grow up, what are some of the health risks. Short-term consequences can include cardiovascular issues. That may include high cholesterol and high blood pressure. High cholesterol—we try to treat it with lifestyle changes, but some kids are actually severely enough where we might need supplements or even medications to treat that. High blood pressure, same thing. Some kids need to have medications if we can’t control it with appropriate weight management and lifestyle management.

Diabetes is often a big concern of families when they come in to see us, because family members may have been affected by diabetes. But there’s a whole spectrum of diabetes intolerance, so we may see kids with just acanthosis nigricans and insulin resistance to then rising glucose levels that may indicate prediabetes and then also frank diabetes, type 2 diabetes. Metabolic syndrome is another entity that in children the definition, unfortunately, isn’t very well defined. But we do know that it is a combination of abdominal obesity, high blood pressure, dyslipidemia, and glucose intolerance. We know that when they’re found together and there’s a combination of these things, it can indicate a higher risk of cardiovascular disease and diabetes risk moving into adulthood. Children with severe obesity have a 50% chance of having some component of the metabolic syndrome.

Sleep apnea—if you are a child with obesity, you have a 6-fold chance of having sleep apnea. Fatty liver disease or the spectrum of nonalcoholic fatty liver disease can also affect children with obesity. If you look at just elevated transaminase levels, it can be found in 10% to 25% of children with obesity. Then, if you get an abdominal ultrasound, it actually can detect fatty liver in 52% of children with obesity. Other GI [gastrointestinal] issues may include gallstones and reflux. Some teenagers, especially girls, can complain of headaches, and so they could be at risk of pseudotumor cerebri. Some of these teenagers also can have hormone

Numbers in black circles designate specific tracks on CD.
imbalances resulting in high androgen levels and being at risk for PCOS, or polycystic ovarian syndrome, especially if they have irregular menstrual periods, acne, hirsutism, and signs of insulin resistance. Many children come in with orthopedic complaints, ranging from joint pain to difficulty walking because of flat feet or foot pain. They can also have curvature in their knees, where they could be at risk for Blount’s disease. Sometimes, they come in with SCFE, or slipped capital femoral epiphysis.

- As you said, every single organ system can be involved. We really try to address obesity at a young age, so we can prevent some of these issues during childhood. As they get older, they can become obese adults. In fact, of those who are obese as teenagers 75% grow up to be adults with obesity. Our generation of children today are the first generation that may have a shorter lifespan than their parents. In fact, they can live 2 to 5 years shorter than their parents if they have obesity as a child and they grow up to have obesity as well.

- Other long-term consequences include cardiovascular disease and cancers, such as breast, uterine, and ovarian cancer in women; and colon, rectal, and prostate cancer in men.

DR. HILL: Wow. I think we do have a role as pediatricians to share some of these risks that we’re seeing in our children. That’s one of our primary concerns, which I think hits home with a lot of the families.

- Then the other big part of it, which I think is underappreciated, is the psychological impact of obesity on children. In 2003, Schwimmer et al did a cross-sectional study where they used a pediatric quality of life measure on children with obesity and they found that the quality of life was also impaired in these children similar to children with cancer. Jessica, our local psychologist, really hits this home with the families. Can you go over some of the impact of obesity on the psychological well-being of our children?

DR. TOMASULA: Would love to. I just want to echo what Samantha said about the quality of life. So, if we can restate it, the quality of life in children with obesity is similar to their peers who have cancer. That’s really upsetting—not only to us as adults and parents, but also when our kids present to us with medical issues. So, my job as part of the team is to assess and intervene on psychological well-being issues. Those are: anxiety, depression, low self-esteem, bullying. These kids have higher rates of bulimia and binge-eating disorders; some 20% to 40% of adolescents with obesity.

- As many as 60% of these children affected by obesity report being victimized by peers. As we know, that’s just those who are reporting. There are plenty of kids who get victimized daily either physically or verbally by their peers in school or within the community who don’t report that. So, 60% is what we’re seeing now, but it’s likely more than that. This affects not only them as individuals as they grow, but also how others see them. There are some interesting data to suggest that teachers have lower expectations for children who are overweight or are obese, so they specifically describe them as untidy or less likely to succeed or more likely to have family problems when compared to their peers without obesity or overweight status.

- Even as young as kindergartners have shown preferences that they would rather play next to a child with a physical disability over a child with obesity. In fact, studies from Budd and Hayman in 2008 found that discrimination against children with obesity has been found in children as young as age 2. So, I think it’s really important for us as clinicians working with the pediatric population to make sure that we’re screening for these concerns or just outright addressing them when doing a work up about their physical concerns; because this can often impact their ability to be successful as a patient and as a family to address obesity.

10. Ibid.
12. See Budd and Hayman (7) in List of Supplementary Reading Materials.
13. See Olshansky et al (18) in List of Supplementary Reading Materials.
you tell us a little bit more, Shirley, about what is the role of genes in the long-term risk of obesity in a child?

**DR. HUANG:** That’s a tough question to answer because I do think genetics has a role in it. It’s not the only piece of the puzzle, but it is part of the puzzle. Twin studies have clearly shown a genetic risk and we also know that if one parent is overweight, then there is a 50% chance of becoming overweight as an adult. If both parents are overweight, then there’s an 83% chance of becoming overweight as an adult. The lifestyle and behavioral piece is definitely something that influences that as well. We know that even though there is a family history of obesity doesn’t mean that the child is destined to have obesity as well. If you look at it on a population level, the rise in the epidemic of obesity has been happening over the past 3 to 4 decades, but the gene pool is not going to be shifting that fast during those 3 to 4 decades. So, it’s not that the genes are changing during that time. It’s too quick to change during that short period of time. There’s got to be some environmental influence as well.

**DR. HUANG:** What are some of the big ones that you think is happening in society that has resulted in this epidemic?

**DR. TOMASULA:** Part of it is a sociocultural phenomenon. This is probably very common in primary care, as we see it in our clinic when we talk to our families about their children who are struggling with obesity. They’ll say, “Oh, it’s just baby fat,” or, “They’ll grow out of it.” It can be challenging to talk to the parents and families to explain that while that might be the case, research suggests otherwise. So, if a child is overweight between 3 and 5 years old, the chance of becoming overweight as an adult is 25% to 50%. That may stem from liking plump babies, looking well fed, having the money to be able to overindulge or to provide the baby or child with any food that they might like. Also, we know the addictive powers of sugar and fast food and processed food. So, coming from my realm of behavior management and parent training, often times we hear parents say, “Well, it was just easier to give them the screen to look at rather than be physically active.” Or, “It was easier for us to give them the high sugary foods to get them to comply.” So, I agree with you that this is a concern. It’s a big issue, a big concern for example, or they might dismiss it. They might not think this is a problem, or their doctors. So, how you approach it with them determines their rapport and your relationship with that family and how they’re going to follow up with you. Because you could be the most brilliant physician with all the guidelines under your belt and you know exactly what to do. But if those families can’t feel like they can trust you or talk to you, then there’s no way that they’re going to be able to follow up with you. So, the weight sensitivity is very important.

If you do have a color-coded BMI chart in your office, that can actually be very helpful. Families can be very visual in learning about different topics, especially regarding your BMI and your weight. When I talk about the BMI, I usually tell families that the BMI is a calculated number using your weight and your height. It tells you how healthy your weight is based on how tall you are. So, I try to shift the focus from just the weight and number, per se, to what is your health risk using your BMI. If you use that color-coded growth chart, you could actually color the very top zone as the red zone, which means it’s the high-risk zone, which is a BMI greater than 95th percentile. You can color the families that the red zone indicates high risk for that child. The yellow zone, which could also mean cautionary zone, is between the 85th and the 95th percentile, and can be associated with some health risks in that child and certainly can be associated with increased health risk in the future. Then the last zone you can color code as green, and you could tell families that this is the healthy zone. It’s the 5th to the 85th percentile, which that child would have low health risks.

After you review the BMI chart with the family, you can use a motivational interviewing technique of using an open-ended, nonjudgmental question to talk about that issue. For instance, an example of how someone might bring up the topic of BMI and the weight is that you could show them the growth chart and you can

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16. See Wintak et al (26) in List of Supplementary Reading Materials.
17. Ibid.
18. See Quartin et al (20) in List of Supplementary Reading Materials.
19. See Barlow (6) in List of Supplementary Reading Materials.
say, “Your child’s BMI is now at 50, which is at the 99th percentile. You child is at very high risk for issues like high blood pressure, diabetes, and high cholesterol, and I would recommend that the weight come down because weight management can certainly help to improve his health risks”. So, that is a true and valid statement. I think that conveys the information to that family. But if you turn that around a little bit and ask if it is in a different way, you might actually elicit a different response from that family. So, another example would be, “Well, it looks like your child’s BMI is 50. It’s at the 99th percentile. At this high-risk zone, he could have a chance of getting high cholesterol, diabetes, and high blood pressure. But what are your thoughts about this? Are you concerned about your child’s weight? Are you concerned about your child’s health?” So, again, you’re not directing the treatment. You’re not telling that family, “Well, we need to lose weight because of these health risks.” You’re just setting the family knows, “Well, this is where he is. This is what this means. And it’s talk about that—tell me what you feel about that.” or, “What do you think about that?” Because if that family doesn’t really care or maybe they’re not really concerned about health, then trying to implement a weight management plan may actually be detrimental. It’s better to uncover why are they not really interested in talking about this. So, I think using a little bit of a motivational technique, where you’re more open-ended in talking about the BMI could be a great conversation starter.

**DR. HILL:** Do you have anything to add from your experiences with resistant families or families who are just unaware of the issue?

**DR. TOMASULA:** I do see a lot of that, because psychologists in integrated care settings are charged with dealing with some perceived difficulties with families. Just to echo what Shirley had mentioned, if you come at it from a nonjudgmental perspective, you can limit that resistance because your orientation is very different. You’re still providing the same information, it’s a more conversational tone. So, I think when we come across families who are struggling with that information, oftentimes, I stop after I provide some information and they usually have a lot to say. If they don’t, then I will follow up on that and say, “How do you feel about that? What does this mean to you?” Sometimes, I’ve gotten tears. Other times, you can see the parents may become defensive or the child will shut down. Pediatricians don’t have a ton of time to be working with parents on any given day anyway, so this can be challenging. To echo what Shirley had mentioned about meeting families where they’re at, this may not be a time where they are ready to start even processing what that means for them, let alone treatment planning. So, it may be something that you have to touch back on. Sometimes we feel like we have to be very proactive, especially when we know all the health risks that are associated with these high BMIs. But if they’re not ready, it’s not going to be helpful. So, I think we have to listen to what they’re saying or not saying and come back at another time if that would be more helpful. Most of the time, you can either tell that by their verbal responses or from their nonverbal responses.

**DR. HILL:** Yes, I agree. I think it’s important to be sensitive to the words that we use, meeting the family where they’re at, and just having an inviting, nonjudgmental space where you can have this discussion. It’s very timely because just this past November, the AAP and the Obesity Society came out with a statement called “Stigma experienced by children and adolescents with obesity.”

They advised pediatricians to use neutral words that are nonstigmatizing with families when they talk about obesity. Words like “weight” and “BMI” are the recommended words versus words like “obese,” “obesity,” “fat,” or “weight problem,” which have been shown to cause sadness and shame in children. Then they also recommend that using the person-first approach, which means putting the disease after the child. This is first a child. This is a human being and they happen to have a chronic condition called obesity. So, the way you talk about it is you say, “A child with excess weight.” when you bring this up with the child, in their medical chart, as well as with families.

Jessica mentioned that, as pediatricians, we have little time to discuss obesity in our practice. Maybe 10, 15 minutes. Maybe 20 minutes if we have adolescent well visits. But it’s a very limited period of time to go over all of these things that we need for an obesity evaluation. So, we recommend having them follow up with the pediatrician in what we call a BMI follow-up visit. As you would do with any chronic condition, such as ADHD (attention-deficit/hyperactivity disorder) or asthma, just have them come back in 1 to 3 months, depending on the severity of their obesity, to delve more deeply into the issues. Shirley, I know you’ve done this, especially in your training, and as an obesity specialist currently, we do this on a daily basis. But looking from the lens of a pediatrician, what are some important aspects of the history that you want to capture when they come back for one of these BMI follow-up visits?

**DR. HUANG:** When you bring that child back for a BMI check or a weight check and you’re trying to do a medical evaluation, I usually try to keep two goals in mind: (1) I am missing a cause for the weight gain that might be organic or medical that I definitely don’t want to miss; then (2) there are any health consequences of obesity that I want to evaluate and treat, if needed. As the pediatrician, if you keep these two goals in mind, your history and exam should follow, because everything that you’re asking that family is trying to answer those two questions.

In terms of the history, you may want to ask about their birth history, their birth weight, any poor feeding during infancy, any developmental delays, any trouble growing, because those things might point you to a genetic condition or maybe an endocrine abnormality. Do they have a family history of obesity, type 2 diabetes, any cardiovascular disease? Because certainly, that could indicate a genetic risk. Do they have any previously diagnosed comorbidities that need to be followed a little bit more in depth? Do they take any medications that might be causing the weight gain, such as steroids or antipsychotics, antiseizure medications, antidepressants certainly can have some weight-gaining effects, even though they need it for other, different reasons? Psychiatric—do they have any underlying depression, anxiety, or any psychosocial issues that might contribute to the weight as well?

**DR. HILL:** The next big piece of the history-taking that I think our lifestyle experts do really well is assessing their diet and activity. So, I go through their regular daily routine, starting with breakfast: what they eat for breakfast, whether it’s at school or at home, what they drink with breakfast. As we know, at least in North

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Carolina, the breakfast is mainly biscuits and PopTarts. So, you always have to delve deeper into what they eat. Same with lunch and dinner and whether they have second servings for dinner and whether they’re having snacks throughout the day.

Then, for activity, I go into whether they still have PE [physical education] in school—now, a lot of schools have limited that, unfortunately; whether they still have recess; if they do anything after school; whether there are safe spaces to exercise; whether there’s a nearby playground or if the neighborhood is safe. Because this all impacts their ability to be physically active. When I ask them about activity, I really need to emphasize vigorous activity, which is what is recommended by the AAP, 1 hour a day, and vigorous meaning they’re sweating, they’re having trouble having a full conversation, their heart rate’s up. You really have to designate that. Because a lot of families will tell me, “Yeah, my kid plays baseball.” But he might be the catcher. Or, “He plays soccer.” But he’s the goalie. So, there’s a different degree of vigorous activity there.1

So, once you assess the lifestyle behaviors, Shirley, where do you go from there as far as your medical interview?

DR. HUANG: I definitely do a focused review of systems and a focused physical exam, again, trying to answer those two questions, “Am I missing a cause for the obesity?” and “Are there any health consequences as well?” So, in review of systems, in terms of pulmonary, you definitely want to ask about asthma, because that can certainly impact the child’s weight. Also, do you have any snoring, any difficulty breathing at nighttime, choking, gasping, any daytime symptoms like being real tired during the day, needing multiple naps during the day, or perhaps they have low attention span. Because these things can point to sleep apnea.

In terms of GI, usually there’s not many complaints, especially if you’re looking for things like fatty liver. But, if you do have reflux, constipation, any difficulty walking, any limb pain, because these things can indicate the slipped capital femoral epiphysis; any osteoarthritis, Blount’s disease; or flat feet as well. Just as a reminder, sometimes with SCFE [slipped capital femoral epiphysis], walking or walk very well, referred knee pain also can indicate possible SCFE.

In terms of endocrine issues, you may want to ask about polyuria, polydipsia, emaciation, any excessive fatigue; because these can point to type 2 diabetes.

7. Depression? Any social avoidance? Do they have anxiety? Do they feel down a lot? Do they experience teasing and bullying? Are their grades dropping at school? Because certainly, depression and other psychological issues can be prevalent there.

Neurologically—a lot of kids may have tension headaches or migraines, but if they do have recurrent headaches, especially with visual disturbances, blurry vision, double vision, ringing in their ears with tinnitus, nausea or vomiting, you may want to think about pseudotumor cerebri.

Then when you go to the exam, again, you’re doing a focused exam, looking for some of these health risks that you’re concerned about. Obviously, you want to take a blood pressure. The appropriately sized cuff is going to be really important because if you use a cuff that’s too small, it can falsely elevate your blood pressure.

9. Looking at their growth chart, is the child really short? But then, you also will need to think about the parents’ height as well. So, you might want to plot a midpoint chart, because if the midparental height is much higher than that child, well, then why is that kid really short? Are there any endocrine or hormone issues? Or perhaps their height is fine at the 50th percentile, but the growth chart shows that his height is actually falling. So, that might indicate hypothyroidism or some other endocrine issue.

Do a good skin exam. You’ll probably find striae on some of these patients and also acanthosis nigricans, so that’s the darkened, velvety rash that you see primarily in the posterior neck, but also in many skin-fold areas. This can indicate insulin resistance. You also want to take a look to see if they have excessive acne or maybe hair in places that a girl may not necessarily want it, like on the face or the back or the chest. Hirsutism and the acne can be signs of high androgen levels, indicating risk for PCOS.

If you have that child with chronic headaches with some of those visual disturbances, you may want to look in the back of their eyes with an ophthalmoscope, making sure that you don’t see papilledema. If you’re concerned about sleep apnea, look in the back of the throat; make sure that the tonsils are not hypertrophied because that can also contribute to the sleep apnea and maybe you want to get the tonsils out as part of the treatment plan. For fatty liver, you want to do an abdominal exam. If you’ve got tenderness or hepatomegaly, it should be looked into a little bit more. If you’re thinking about genetic syndromes, take a look just any dysmorphic feature; do they have small hands, do they have polydactyly; do they have a small penis, undescended testicles? So, again, a focused exam looking for some of these causes or consequences of the obesity.

DR. TOMASULA: Yes. If you haven’t implemented it yet, your medical assistant can ask the PHQ-2 [Patient Health Questionnaire-2] verbally as part of the flow sheet. If that is positive, so you answer yes to either question, then you give the paper form of the PHQ-9A for 11- to 17-year-olds. You can use the Pediatric Symptom Checklist for those under age 11, but the PHQ-9A is a great depression screening that’s used in the adult population and is used very frequently in the pediatrician’s office.

DR. HILL: Where can they get that?

DR. TOMASULA: It is free online; and the scoring is very easy.

DR. HILL: Just a quick word about labs that you would do for your screening patients. What is recommended by AAP is for kids ages 2 to 9, if they are overweight—a BMI over 85th percentile—to definitely get a fasting lipid profile. This is seconded by the American Heart Association to screen all kids between the ages of 9 to 11 and again between 17 to 21 to pick up more of these familial hypercholesterolemias. Then for those who are overweight, a BMI between the percentiles of 85 and 94, as well as over age 10, in addition to the lipids, you would add a glucose, particularly if they have risk factors for diabetes with positive family history, certain ethnicities, other than non-Hispanic white, or signs of insulin resistance. Then for obese patients ages 10 to over, we do a fasting lipid profile, glucose, ALT [alanine transaminase] and AST [aspartate ami-
We completed our evaluation. So, where do we even begin with treatment? What I really liked when | I was in primary care was a very simple acronym that I would use to start finding modifiable life- | style behaviors that the family can address. It’s a very common acronym. It’s called 5, 3, 2, 1, 0. There might be different versions. What I use is “5” standing for aiming for 5 | fruits and vegetables a day; “3” would be structured meals with the TV off; “2” would be limiting screen time to 2 hours or less—for kids under 2, the recommenda- | tion is no screen time unless they’re Face- | Timing with Grandma; and “1” would be 1 hour or more of activity, and even more for preschool kids. | I talk about aiming for “0” sugar drinks, including sweet tea and | Gatorade and sport drinks and fruit punch; | and if you’re going to have juice for 100% | fruit juice, 4 oz to 6 oz a day. I usually present these recommendations to the family and then might ask them, “Which one of these would you guys like to work on?” or, “What do you think you would like to work on to get healthier as a family?” Sometimes, that approach works. I think it’s all in the manner of how we communi- | cate our intention with families. Sometimes, if their weight is so high, it doesn’t really make sense for me to give them an ideal body weight, because it may not necessarily be achievable. How- | ever, we do know that if children and adoles- | cents are able to lose at least 5% to 10% of their weight, it can result in a significant improvement in their health risks and comorbidities. So, that’s where I usually start with families. If they really want a | weight number, I will start with a 5% | weight loss and help them to achieve that goal. My primary goal, ultimately, is for | them to be healthier and making those | lifestyle changes.

I usually also talk about a safe rate of | weight loss, not a goal rate of weight loss. So, as that example where a child is trying to lose 5%, maybe that 5% equates to 10 lb. I might tell them, “The 10 pounds, that’s going to be our short-term goal over the next several months or so. But I want to make sure we are losing weight in a healthy way, and that’s not too fast.” So, if you have a young child who has obesity with a BMI of greater than 95th percentile, if these kids are younger than 5 years of age, they should not lose more than 1 to 2 lb a month. If they are older than 6 years of age, then they can lose up to 1 to 2 lb a week. But I make clear to the families that is a safe rate of weight loss, but it’s not an expected rate of weight loss necessarily.

DR. HUANG: There are four stages of weight management types of programs that the AAP has outlined in 2007 through the Expert Committee. As you mentioned, stage 1 is prevention plus, and it’s in the primary care setting. All these stages really depend on what your primary care office has in terms of resources and also what the severity of that child’s weight is. So, in that prevention plus phase, they’re work- | ing one-on-one with the pediatrician and probably following up every 3 to 6 months. If that is not working well, they can up it to the second level, which is called the structured weight management, and essentially, that is a partnership between the primary care provider and then another specialist, such as a diettian, or maybe there’s an exercise specialist or a | behavioral specialist in the area. Maybe that extra specialist is part of that practice, and perhaps that specialist is someone that they refer out to. But that gives them a lit- | tle bit more additional structure and a sup- | port for that weight management. At that level, you’re probably working about once a month. If they need to move up to a higher intensity level, that would be stage 3, which is a comprehensive mul- | tidisciplinary intervention. You might have | physicians, nurse practitioners, dietitians, | exercise specialists, psychologists, and | social workers. The intensity of your | behavior change is higher, and you proba- | bly are working weekly to monthly. Stage 4 | is then the tertiary care intervention, and | this may include programs that incorporate | very low calorie diets, medications, and | surgery.5

DR. HILL: Great. You mentioned differ- | ent models that this can present in. For | stage 2 and 3, we do need some extra ancillary staff support to be able to accomplish this, for example, having a diettian, either accessible locally or within the practice. Jessica, I know you’ve worked at a federally qualified health center with integrated mental | health. You were their local psychologist on site. Can you tell us what that could
What does this actually look like in a practice and why that would be a benefit to the patient?

**DR. TOMASULA:** Pediatric integrated care is definitely the way that we're moving in the healthcare system, which is great. Having experience in this area touch on some of the advantages of becoming a patient-centered medical home with integrated behavioral health services. But I strongly encourage you to visit the website Collaborative Family Healthcare Association, or CFHA, at www.CFHA.net. Also, the American Psychological Association, or APA, published a brief paper and a corresponding video that speaks to the advantages of providing behavioral health services within primary care. Just some of those are psychologists or behavioral health specialists provide a lot of parent education, so behavior management, even infant care strategies; screenings, so developmental, social/emotional, maternal depression; assessment, typical ADHD, bedwetting, school avoidance; care management with school personnel, like teachers and school psychologists; and also referrals for eating disorders, family therapy, or even specific treatment modalities, like Trauma-Focused Cognitive Behavioral Therapy or Trauma-Focused CBT, mostly for those children who've experienced sexual abuse. These services can definitely benefit patients by reducing the stigma of behavioral health services. I'm sure as primary care physicians, you make referrals and either they don't go, or they don't enjoy their experience if they actually do go, or maybe it's too expensive, or they have transportation issues. If you integrate behavioral health services, that reduces the stigma. They come exactly to the same place that they're used to: location, exam room, staff, comfort level is all the same, which increases their show rate. It can also improve your communication and collaboration and consultation among the primary care physicians and also the behavioral health providers.

What does this actually look like in order to facilitate that? Provider pods are a huge thing. It's not the way we're doing it order to facilitate that? Provider pods are a huge thing. It's not the way we're doing it. Another thing is behavioral health providers typically see patients in the exact same exam room, so a special location or set up isn't needed. We do what's called warm hand offs or meet and greets to integrate behavioral health services. Sometimes, we're not scheduled. We don't have the time. But if they can just meet me, ask any initial questions they have of me, or I can go over a very brief purpose of my role in the weight management team or even in the primary care setting. Those are just a few advantages of becoming a patient-centered medical home with integrated behavioral health.

**DR. HILL:** Jessica, can you tell us a little bit about how we guide families in setting one of these lifestyle goals?

**DR. TOMASULA:** Yes. We all want to help families identify goals so that they can become successful. There's this idea of behavioral momentum. Just as Samarah had mentioned, allowing them to select what area speaks to them most then engaging with the families using motivational interviewing principles, that's really helpful. I would encourage everyone—staff, nurses, medical assistants, even front office staff, not only providers—to engage in motivational interviewing and ask within their life, at that current moment, what is realistic? Usually, if we can get them working in one area, say, exercising more, then we can go over that SMART acronym [specific, measurable, attainable, realistic, and timely]. I always like to say when we're trying to come up with guidelines of goals, “Does that work for you?” If someone says, “I think I'm going to do that every day this week.” “Is that realistic for you?” “Does that include weekends?” becoming more specific in your language to identify what are SMART goals. The AAP offers a mobile application named Change Talk to teach these motivational interviewing skills. A version is also available at the Institute for Healthy Childhood Weight. When you're good at motivational interviewing, it's quick and effective. I will tell you, when you do the trainings, it seems like it's common sense, but it is very difficult to apply. Multiple trainings or exposures are definitely beneficial.

**DR. HUANG:** Just thinking about a patient that I've recently seen. One of the big challenges that I've heard from families is that their kids might not eat vegetables. That's something I hear often. Looking at this approach in motivational interviewing, what are some tactics that you have that you would address that concern from a family?

**DR. TOMASULA:** If families like to cook, hiding vegetables in meatballs and things like that can be a way to go. There are plenty of recipes, apps and cookbooks, even just Googling can help you find ways to hide vegetables. But, I say the path of least resistance is always helpful. So, even though corn isn’t ideal, if they like eating corn, start with that. Then you can even add in the mixed vegetables of carrots and peas. I would definitely ask school personnel or daycare personnel if they're eating vegetables there and just not eating them at home, because that is very, very common. It might not be a food aversion. It's a compliance issue, essentially. Our friends in the occupational therapy world would say that it takes multiple exposures, up to 12 to 14 times, for infants and children to really determine whether they like a food. So, any way that you can change the way that type of food is consumed, the better. Broccoli—you can serve it raw, you can serve it steamed, you can hide it in things.

**DR. HILL:** Shirley, if you can share with us a little about some of the medications I'm sure the pediatrics will see in some of our more severe obese patients. What is approved? What is not approved? How are they used?

**DR. HUANG:** Yes. This is an exciting topic because 5 years ago, we didn’t have many options at all, and now we actually have six weight loss medications that are FDA approved for adults. In children, we're a little bit more limited since they are not FDA approved until age 18 and

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22. See American Psychological Association (5) in List of Supplementary Reading Materials.

23. See American Academy of Pediatrics Institute for Childhood Weight (2) in List of Supplementary Reading Materials.
you have to have a BMI greater than 30 or a BMI greater than 27 with a comorbidity.

Before I get into the FDA-approved medications, I just want to comment on metformin. It’s actually been used safely for decades in children ages 10 years and up, essentially for type 2 diabetes. But, it has been used off label for insulin resistance, prediabetes, and weight loss. It has a very good safety profile, so clinicians often trial this medication first. But it has very poor efficacy for weight loss. So, I actually don’t like to use this much for weight loss, per se. Orlistat is an FDA-approved medication actually for ages 12 years and up. It’s a pancreatic lipase inhibitor that works by blocking your dietary fat absorption. However, the efficacy is really limited and minimal and the GI side effects are pretty significant. So, again, another medication that has some limited use clinically. Phenetermine is approved for ages 16 and up. It’s a medication that’s been approved for weight loss since 1959. So, we’ve had decades of experience with this medication. However, it’s only approved for a short-term use of 12 weeks. But you can actually use it long-term by alternating the medication with some medication holidays, so maybe it’s on for 3 months and then off for a month.

The remaining four FDA medications are only approved for ages 18 years of age and up. I just want to mention them briefly. The first one, called lorcaserin, was FDA approved in 2012. It’s a selective serotonin 5HT2C receptor agonist, or it’s also known as 5HT2C agonist. It actually works in your CNS system to help increase your satiety. It’s a selective serotonin receptor agonist, or it’s also known as a 5HT2C receptor agonist, or it’s also known as 5HT2C agonist. It actually works in your CNS system to help increase your satiety. It has about a 3% weight loss effect. Phenetermine and topiramate is now a combination medication that came out in 2012. I like to think about it as like the Cadillac medication of all the weight loss medications because it can actually help you to lose up to 9% to 10% of your weight, so it works pretty well. The topiramate part modulates your GABA receptors, but we don’t really know how it affects weight loss. A combination medication of naltrexone and bupropion was released in 2014 and it has a 6% weight loss effect. The last one, called liraglutide, was approved in December of 2014. It’s a GLP1 agonist often used in type 2 diabetes. It stimulates your vagal and CNS system and has a 3% to 6% weight loss effect. This medication, however, is a subcutaneous form; it’s an injection form. So, some children and adolescents may not necessarily like this form. But I’m happy that we actually have some weight loss medications as options for some of our high-risk teenagers, especially since the behavioral interventions may not necessarily be enough for some of these children.

DR. HILL: I agree. That’s part of the tertiary care that we provide in our weight management program and most programs around the country. The last resort, or more severe patients, could qualify for bariatric surgery. There is no current universally accepted standards yet for bariatric surgery, but they are coming. Generally, what we do at WakeMed is consistent with a lot of practices. Most insurance companies do require at least 6 to 12 months of medical management within a program to even qualify for surgery; and it needs to be documented by a dietitian that they’re working on lifestyle behaviors, as well as by the physician on their weight loss attempts. My goal is weight maintenance during the 6 to 12 months, because most of these patients will continue to gain weight and weight loss would be bonus. Criteria to qualify—AAP recommends a BMI over 40 with moderate-to-severe comorbidities and BMI over 50 with no comorbidities. Most practices, I believe, use the adult criteria as well, that a BMI over 35 with major comorbidities, such as type 2 diabetes or sleep apnea or severe nonalcoholic hepatitits would qualify or a BMI over 40 with other comorbidities such as hypertension, insulin resistance, or mild sleep apnea.

The two main forms of surgery that are happening in the country right now are sleeve gastrectomies followed by gastric bypass. Both of those work with the principle of restriction and effects of malabsorption. One of the major issues that parents have with surgery is the complication risk. Actually, adolescents do about the same or even better than adults as far as surgical complications. The major ones acutely might be bleeding or gastric leak; and long term, some nutritional deficiencies.

The Teen-LABS (the Teen Longitudinal Assessment of Bariatric Surgery) group led by Thomas Inge did a great 3-year outcomes results on comorbid conditions and the resolution post-surgery. They do show great resolution of diabetes in about 95% of patients and high blood pressures in about 74% and 66% in high cholesterol. We know that of all of our modalities that we have, bariatric surgery is probably the most effective to reverse severe obesity, but really has to be in the context of a medical management program. Any last thoughts that you have, Shirley, for our colleagues?

DR. HUANG: One pearl that I’ve learned throughout my years of doing weight management in terms of tools for behavior change is the concept of self-monitoring. The self-monitoring tool can be so effective; it’s the most effective behavior change tool. You don’t even need to set a goal, but if you have a family just monitor what they’re doing, that will actually help them make behavior change. This is across all different types of behavior change, like smoking, it doesn’t necessarily just have to be obesity. But, if families are able to monitor their intake or their activity levels, it could be a really great tool for weight change.

DR. HILL: Great. Jessica, do you have any final thoughts for our colleagues?

DR. TOMASULA: The medication that can be the biggest household change is something called stimulus control, which means that if you don’t have it in the house, you can’t eat it. So, I try to counsel families to say, if you want a treat, just make sure to go get that ice cream cone outside of the household rather than keeping the carton of ice cream within the home. For budget-friendly families, it’s not as if they can all eat all of the unhealthy snacks or foods from their pantry. That’s just not feasible most of the time. So, coaching them to work on healthy replacements to do over time—so, white to brown rice, white to whole wheat bread; tried to baked chicken—based on their cultural group and how comfortable they feel with trying those things. So, I’d say stimulus control can be something that you can
touch on multiple times and strategize around for many sessions.

DR. HILL: Wonderful. I’d like to thank Shirley Huang and Jessica Tomasula for joining us today. I’d also like to thank the Washington University School of Medicine and St. Louis Children’s Hospital for giving us the opportunity to discuss, “Childhood Obesity.”

List of Supplementary Reading Materials

To help you obtain more information on the subject of this program, the following supplementary reading materials are recommended:


Answers to Pretest Questions

1. False
2. True
3. True
4. False
5. True
6. True
Post-test Questions

After listening to the audio CD and reading the transcript of this panel discussion, measure your understanding of the subject by answering the multiple-choice questions below or online at www.pedupdate.com.

1. Check only one answer for each of the 12 questions.
2. When you have completed the test, transfer all 12 responses to the Post-test Response Form.
3. Return your answers in the preaddressed envelope marked “Post-test Response.”
4. Your confidential score will be sent to you on a quarterly basis.
5. If any questions are answered incorrectly, the cumulative score card will indicate the paragraph numbers where the correct answers will be found.
6. Washington University designates this enduring material for a maximum of 3 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

CME credits can be earned for tests when submitted no later than 3 years from the date of publication. All tests received by December 31 will be credited for the year submitted. In order to receive credit, a participant must have a designated passing grade of 75%.


1. Quality of life in children with obesity is similar to their peers diagnosed with:
   a. diabetes
   b. cancer
   c. depression
   d. nocturnal enuresis

2. Current research suggests that children who are overweight or obese are more likely to experience discrimination due to their weight status from:
   a. grandparents
   b. parents
   c. peers
   d. siblings

3. If a child is overweight between the ages of 3 and 5 years old, the chance of them becoming overweight as an adult is approximately:
   a. 5% to 15%
   b. 25% to 50%
   c. 55% to 70%
   d. 75% to 95%

4. A 14-year-old boy with obesity presents with a 3-week history of progressive pain in his knee. He has difficulty bending down to touch his toes. The most plausible explanation for his knee pain is:
   a. pes planus
   b. Osgood-Schlatter’s disease
   c. Blount’s disease
   d. slipped capital femoral epiphysis

5. You are seeing an adolescent female in your practice who presents with obesity, irregular periods, occipital headaches (that are increasing in severity, tinnitus, and blurry lateral vision). What obesity-related comorbidity do these symptoms suggest?
   a. Migraines
   b. Anorexia
   c. Polycystic ovarian syndrome
   d. Pseudotumor cerebri

6. What is the recommended frequency of follow-up visits during the prevention plus stage of obesity management?
   a. Every week
   b. Every month
   c. Every 3 to 6 months
   d. Every 6 to 9 months

7. The SMART acronym used in motivational interviewing refers to setting goals that are:
   a. supportive, meaningful, adaptable, responsive, and targeted
   b. sustainable, modifiable, accountable, rational, and tailored
   c. specific, measurable, attainable, realistic, and timely
   d. strategic, motivational, assertive, rapid, and thorough

8. In the absence of any comorbidity, the minimum BMI threshold required to treat an 18-year-old patient with a weight-loss medication is:
   a. 27 kg/m²
   b. 30 kg/m²
   c. 35 kg/m²
   d. 40 kg/m²

9. A 16-year-old boy presents for follow-up. He is frustrated about his lack of weight loss despite trying to be healthier. He is 205 lb today with a body mass index (BMI) of 40 kg/m², losing only 5 lb over the past year. His mother asks about any medications that he could try. Which medication can be considered in this boy?
   a. Liraglutide
   b. Phentermine
   c. Lorcaserin
   d. No medications are approved in this age group

10. The FDA-approved weight loss medication that has been shown to result in the greatest percentage of weight loss in patients is:
    a. Lorcaserin
    b. Phentermine
    c. orlistat
    d. combination phentermine and topiramate

11. What is a common long-term complication of a gastric bypass surgery?
    a. Gastric leak
    b. Vitamin deficiencies
    c. Bleeding at staple line
    d. Gastroesophageal reflux

12. A 5-year-old girl presents to your office for follow up for her weight. You have been working on limiting sweetened beverages with the family. However, mom is very frustrated since the girl tantrums when she is not allowed to drink her fruit punch juice box that she will get on her own in the cupboard after school. What is the most effective strategy that you may discuss with mom?
    a. Give her orange juice instead as a substitute
    b. Hide the juice box above the refrigerator
    c. Remove the juice box from the house
    d. Put her in a short “time-out” when she tantrums